

unaided eye. There is therefore abundant room for a large variation in the navigator's estimate of the motion of the cloud.

The editor of the Pilot Chart says:

The statement to which Mr. Quinn calls attention was made with full knowledge that it was in opposition to the generally accepted theories of an eastward drift at high altitudes in the Tropics. It is, however, in accordance with the observations upon which the major portion of my hurricane article is based, namely the Greenwich mean noon observations returned by the voluntary meteorological observers afloat and cooperating with this office. These agree in showing that in the vicinity of the West Indies and during the hurricane season the motion of *what they call the upper clouds* is from a point between north and east, while the motion of *what they call the lower clouds* is from a point between south and east. It may be that the navigators did not properly distinguish between upper and lower clouds, or that they, on rapidly moving vessels, were unable to detect the slow eastward drift of the lofty cirrus. But inasmuch as my article was written for their benefit, and with the hope that it might prove of practical value to these observers in time of need, it seemed wise to adopt their system of classification and to present the phenomena as they appeared to, and were recorded by, the men for whom I was writing. It did not seem wise to attempt to explain to them that what they were in the habit of calling upper clouds were not upper clouds at all, or that the motion which they had recorded as taking place from the east was really in the opposite direction. It would probably have been safer to have based my statements upon the facts recorded by trained observers at regular meteorological stations. I may do this in future editions of the article, and at the same time request the mariner to see and record the facts as they really are rather than as they appear to be. Definite instructions to the voluntary meteorological observers at sea were first issued in 1901, prior to which time, and in some cases subsequently thereto, the cloud observations were signally lacking in accuracy.

My own analysis of the frequency of cloud motions during hurricane months, as observed at Belen College, Havana, gives the following figures:

Clouds.	Number of observations.	Percentage of frequency of movement from—			
		NE.	SE.	SW.	NW.
Upper.....	645	23	8	39	30
Lower.....	650	44	34	15	7

Mr. Page's analysis of the Havana observations shows that there is a very respectable percentage of upper cloud movements from the east. The extensive studies made by Professor Bigelow (see MONTHLY WEATHER REVIEW for April, 1904) show that great variations occur in the level that separates the upper westerly from the lower easterly movement. It may be quite possible that observers, both on land and sea, are unable to distinguish the altitude of a cloud by means of its appearance, and that so-called cirrus clouds are below the normal altitude as frequently as they are above it. It may be that cirrus clouds actually occur in the lower stratum as well as in the upper. The Editor observed continuously with his marine nephoscope on the island of Barbados and in its vicinity, during the cruise of the *Pensacola* in February, 1890, and found true cirrus clouds moving in a variety of directions between northwest and southwest and with a great variety of velocities. We should never forget that cirri and cirro-cumuli often form at the boundary between two layers of wind; the movement of the cloud is the resultant of the action of the two winds, and does not represent the actual motion of either nor the motion of any very important thick layer of air. The clouds simply move within the thin layer of mixture that separates the two more important masses.

Again, there can be no doubt that ascending masses of northeast trade wind and descending masses of southwest return trade frequently come into contact or collision, especially during the warmer part of the day, each obstructing the other's progress. As we approach the equator all trade-wind motion from the northeast gradually dies away. It can, therefore, happen that at points considerably removed from the equator the obstructed winds, rising and carrying their clouds with them, may produce the phenomenon of cirrus

clouds from the northeast, while below these the descending winds may carry light cirrus clouds from the west. It seems likely that this phenomenon would occur most frequently on the northerly border of the track of a hurricane.

The more we consider the question here under discussion, the more convinced we must be of the great importance of improving and extending the methods and observations of the whole system of cloud observations on land and on sea.—C. A.

THE DISSEMINATION OF DAILY FORECASTS BY TELEPHONE.

By WM. G. BURNS, Section Director, Springfield, Ill., dated June 27, 1904.

The rapid development of telephone service in the Middle West, especially in the rural communities, has opened up a great field for the dissemination of the daily weather forecasts. This effective means was recognized over a year ago, and attention was invited to the fact in the Annual Report of the Illinois Section for the year ending June 30, 1903. While the development of the service in this section does not yet show altogether satisfactory results, arrangements are now under consideration whereby it is believed the information will be made available for 250,000, or more, telephone subscribers in small towns and rural districts.

The census of 1900 has credited Illinois with 264,000 farms, fully one-half of which, it is believed, are now supplied with telephones. The work of building new lines and connecting the different exchanges is rapidly progressing, and information has been received that one telephone supply house alone is furnishing new material in that direction at the rate of \$500,000 a year.

A convention of State telephone managers was recently held in Springfield, Ill., and opportunity was afforded to address the body on the subject of cooperation. It was represented that all progressive exchanges maintained an information operator, and as the weather and its changes formed a vital subject of interest to the rural communities, the information operator would not be well equipped without this intelligence. It was further stated that in extending the telephone service the fact that the weather information would become available to its subscribers, would often be the determining factor in inducing an irresolute farmer to enroll. The facts presented were well received and active cooperation was promised. It has been planned to offer the service to telephone exchanges, and then notify the public through the press that the information is available.

Under the growing operation of connecting the exchanges into one vast homogeneous system, it will not be necessary to send telegrams to all, but, by careful selection of well located centers, a large territory may be covered by relaying the information from one exchange to another.

The following extract from the Copper Country News, Calumet, Mich., of June 21, 1904, shows that the plan which Mr. Burns advocates in Illinois has been approved in Ohio and Kentucky.

The extent to which the Weather Bureau is appreciated and utilized by the farmer is exemplified by the fact that the Cincinnati and Suburban Telephone Company has made an arrangement with the Weather Bureau in Cincinnati by which the farmers in surrounding counties in Ohio and Kentucky are enabled to get the daily morning forecast of the weather almost as soon as it is made.

The plan is to have the forecast telephoned immediately after its making to the central exchange in Cincinnati, which in turn will telephone it to the local exchanges in eight counties. These are to give out the information to the patrons in those places free of charge.

ATTEMPTS AT METHODICAL FORECASTING OF THE WEATHER.¹

By LOUIS BESSON.

[Translated by Miss R. A. Edwards.]

At the present time scientific forecasting of the weather is

¹ Annuaire de la Société Météorologique de France, April, 1904, pp. 92-97.